REMARKS

This application has been reviewed in light of the Office action dated October 6, 2006. Claims 1-52 are pending in the application. By the present amendment, claims 1, 5, 21, 28, 44 and 48 have been amended. No new matter has been added. The Examiner's reconsideration of the rejection in view of the amendment and the following remarks is respectfully requested.

By the Office Action, claims 1-19, 21-42 and 44-52 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

Claims 1, 21, and 44 have been amended in a way believed to overcome the rejection. Reconsideration is respectfully requested.

By the Office Action, claims 1, 6-8, 12-14, 20-23, 29-31, 35-37 and 43 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,303,132 to Islam et al. (hereinafter Islam).

Islam is directed to a cache system where a status is provided for each item in memory, and depending on the status, a matrix is employed to determine an appropriate consistency function to use.

Claim 1 recites, *inter alia*, applying a plurality of consistency policies in which application of at least one consistency policy results in different system performance than a second consistency policy; and selecting a consistency policy from the plurality of consistency policies for an object, wherein the selection is made to improve system performance.

Islam does not correlate system performance with the selection of a consistency policy. Nowhere in Islam is one policy selected over another based upon the performance of

the system. Instead, Islam provides that under particular circumstances as defined by a matrix, a consistency function is called and executed. The system of Islam does not set forth policies which vary in level of consistency or provide different performance capabilities. Furthermore, Islam does not define consistency functions or any other entities in enough detail to permit one to conclude that they define or implement consistency policies as used in the present application.

In stark contrast, claim 1 recites: applying a plurality of consistency policies in which application of at least one consistency policy results in different system performance than a second consistency policy; and selecting a consistency policy from the plurality of consistency policies for an object, wherein the selection is made to improve system performance.

The Examiner cites FIG. 14 and col. 1, line 50- col. 2, line 3 of Islam. FIG. 14 and the cited text provide for the execution of consistency action under different matrix conditions, e.g., read or write, ignore change, modify item, propagate a change, etc. These actions are performed without regard to system performance. There is no ability in Islam to select a different policy based upon system performance. In fact, it is respectfully suggested that the consistency functions or actions provided in Islam are all part of a single consistency policy or protocol, and as such the system of Islam cannot provide for the selection of consistency policies to adjust system performance. In other words, the consistency actions in total may provide a single consistency policy, and not separate or different policies as set forth in the present claims.

The Examiner further cites col. 10, line 58 through col. 11, line 14, which states in part:

"The consistency-action matrix (140) is a generic mechanism that can be used to implement a variety of different cache consistency protocols. As will be understood by one having skill in the art, some policies can be implemented in different manners by the inventive mechanisms. Therefore, only one method is detailed below, which may be the appropriate and optimal for some, but not all, protocols."

As described, it is apparent that only one protocol is contemplated for a system. While this protocol may be different for different systems, multiple protocols are not suggested to be selectable by a single system. In fact, nowhere in Islam is it disclosed or suggested to select a consistency policy based upon system performance, and in addition, Islam does not disclose or suggest choosing a consistency policy for at least one object, which maximizes system performance or wherein system performance is maximized by adjusting at least one of CPU overhead, communication latency and message overhead <u>as recited in claims 12 and 13</u>.

Along similar lines, claim 21 includes, *inter alia*, a method for maintaining consistent copies of the object, including maintaining consistency using a <u>plurality of consistency policies </u>in which <u>at least one consistency policy achieves stronger consistency results than a second consistency policy; and selectively choosing a consistency policy for at least one object, which balances between consistency level and performance.</u>

Islam fails to disclose or suggest a plurality of consistency policies which include levels and balancing between levels of consistency and performance. Nowhere in Islam is at least <u>selectively choosing a consistency policy for at least one object, which balances between consistency level and performance</u> disclosed or suggested.

In addition, Islam does not disclose or suggest choosing a consistency policy for at least one object, which maximizes system performance or wherein system performance is maximized by adjusting at least one of CPU overhead, communication latency and message overhead as recited <u>in claims 35 and 36</u>.

Claims 20 and 43 include similar recitations as claims 1 and 21, respectively. It is therefore respectfully submitted that claims 1, 20, 21 and 43 are in condition for allowance over Islam for at least the stated reasons. Claims 2-19 and 22-42 are believed to be in condition for allowance due at least to their dependency from claims 1 and 21, respectively. However, other reasons exist for allowing these dependent claims. For example, claims 12, 13, 35 and 36 as described above.

By the Office Action, claims 2-3 and 24-26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Islam in view of Stenstrom ("A cache consistency protocol for multiprocessors with multistage networks", ACM 1989, pp 407-415).

Stenstrom provides a consistency protocol that is implemented in hardware to provide high speed response. The Examiner states that Stenstrom teaches update-all, update-holders, coordinate-all, and coordinate-holders policies as recited in the rejected claims. The Applicant disagrees. Stenstrom fails to teach or suggest such policies and does not teach or suggest deferred invalidation consistency as well. The present specification sets forth the features of these policies and Stenstrom fails to disclose such policies. Even if, *arguendo*, similar policies types are described, Stenstrom fails to cure the deficiencies of Islam as set forth above.

Reconsideration of the rejection is earnestly solicited for at least the reasons stated.

By the Office Action, claims 4-5, 15, 27-28 and 38 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Islam in view of US Patent Publication No. 2003/0061272 (hereinafter Krishnamurthy).

Krishnamurthy is directed to a system where strong and weak consistency policies are described with associated benefits to implementing each. While Krishnamurthy mentions strong and weak consistency methods, these do not resemble the strong and weak policies as set forth and defined in the present specification (see e.g., strong and weak consistency (last paragraph on page 6 of the present specification). Krishnamurthy fails to provide such descriptions and merely uses strong and weak as a relative modifier to describe different policies known in the art. In addition, Krishnamurthy does not properly disclose how to achieve different levels of consistency, and the approach described in paragraph 9 on page 1 of Krishnamurthy is insufficient to achieve strong consistency in a distributed system as recited in the present claims.

Notwithstanding this, Krishnamurthy fails to cure the deficiencies of Islam as described above. Reconsideration of the rejection is earnestly solicited.

By the Office Action, claims 9-11 and 32-34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Islam in view of US Patent Publication No. 2002/0107935 (hereinafter Lowery).

Lowery is directed to a cache system and discloses the ability to monitor active or inactive states of caches. However, Lowery does not disclose or suggest a consistency

coordinator, which manages the consistency policies of a system. Lowery does not teach a cache managing element as the Examiner states, and certainly does not teach a managing element that manages the policies for the caches. The active or inactive status of a given cache is an indicator to a community of whether a cache may be employed or not. Further, Lowery fails to disclose or suggest such a managing element that maintains connections with caches <u>in the system in accordance with the activity of the consistency coordinator</u>.

Therefore, Lowery fails to disclose or suggest at least: <u>measuring activity</u> of a consistency coordinator, which <u>manages the consistency policies in the system</u>; and maintaining connections with caches <u>in the system in accordance with the activity of the consistency</u> coordinator, as recited in claims 9 and 32. Further, Lowery fails to cure the deficiencies of Islam as described above. Reconsideration of the rejection is earnestly solicited for at least the stated reasons.

By the Office Action, claims 16-19, 39-42, 44 and 49-51 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Islam in view of U.S. Patent No. 6,145,054 to Mehrotra et al (hereinafter Mehrotra).

Mehrotra is directed to a cache system with multiple levels of caches. Each cache level includes a miss queue. Mehrotra does not disclose or suggest multiple queues for single caches and further fails to disclose or suggest priority levels for the queues.

Claim 44 recites, *inter alia*, a system for maintaining consistent copies including: a plurality of caches for storing objects; <u>each cache comprising at least two queues, which designate an update priority of the object included in each queue</u>; a plurality of consistency policies maintained throughout the system such that at least <u>one consistency policy</u>

results in different performance than a second consistency policy; and a coordination coordinator having selective communication with the caches, which manages requests for updates from the caches in accordance with the queue priority.

The cited combination of Islam and Mehrotra fails to disclose or suggest at least that: 1) each cache includes at least two queues, which designate an update priority of the object included in each queue; 2) a plurality of consistency policies maintained throughout the system such that at least one consistency policy results in different performance than a second consistency policy; and 3) a coordination coordinator having selective communication with the caches, which manages requests for updates from the caches in accordance with the queue priority.

While Mehrotra includes more than one queue in the system, these queues are associated with an entire level in a hierarchical cache system. Further, each cache device does not include at least two queues where the queues designate an update priority. In addition, no consistency coordinator is disclosed in the cited combination, which manages requests for updates in accordance with queue priority. Mehrotra also fails to cure the deficiencies of Islam as set forth above. It is therefore respectfully submitted that claims 16-19, 39-42, 44 and 49-51 are in condition for allowance for at least the stated reasons. Reconsideration is earnestly solicited.

By the Office Action, claims 45-46 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Islam in view Mehrotra and further in view of Stenstrom. Claims 47-48 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Islam in view Mehrotra

and further in view of Krisnamurthy. Claim 52 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Islam in view Mehrotra and further in view of Lowery.

It is respectfully submitted that claims 45-48 and 52 depend from claim 44 which is believed to be in condition for allowance over the cited art. Reconsideration of the rejections is earnestly solicited.

While the Applicant believes that the present claims are not anticipated and not obvious in view of the cited art, it is noted that Islam and the present application are commonly assigned and owned. Should the Examiner decide to provide an **obvious-type double patenting** rejection, the Applicant would consider filing a **terminal disclaimer** to overcome such a rejection.

In view of the foregoing amendments and remarks, it is respectfully submitted that all the claims now pending in the application are in condition for allowance. Early and favorable reconsideration of the case is respectfully requested.

It is believed that no additional fees or charges are currently due. However, in the event that any additional fees or charges are required at this time in connection with the application, they may be charged to applicant's IBM Deposit Account No. 50-0510.

Respectfully submitted,

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